

Amendment Under 37 C.F.R. § 1.111
USSN 10/058,106
Attorney Docket Q68067

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1-15. (Canceled)

16. (New) A remote laser welding system comprising a laser beam generator generating a laser beam along a vertical direction and an optical unit consisting of an optical head including mirror orienting means to orient said laser beam in a spatial sector and focusing means to focus the laser beam inside a spatial sector, wherein said mirror orienting means comprise stationary mirror to deviate said laser beam from a vertical direction to a horizontal direction, and a mobile mirror pivoting on a first horizontal axis arranged on the plane of said mobile mirror orthogonally to said horizontal direction and turning on a second horizontal axis coinciding with said horizontal direction to orient said spatial sector on a vertical plane, and wherein said focusing means include a focusing lens arranged upstream of said stationary mirror, said focusing lens being vertically displaceable within said head along said vertical direction so as to focus said laser beam on different distances inside said spatial sector.

17. (New) System according to claim 16, further including high dynamic actuating means to control the angular movements of said mobile mirror respectively on said first axis and said second axis.

18. (New) System according to claim 17, wherein the pivoting angle of said first axis is in the order of $\pm 15^\circ$.

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19. (New) System according to claim 17, wherein the rotation angle of said second axis is in the order of $\pm 140^\circ$.

20. (New) System according to claim 16, wherein said spatial sector is a spherical crown sector.

21. (New) System according to claim 16, wherein said optical head is translatable along a vertical axis.

22. (New) System according to claim 16, wherein said optical head is applied to a robot for welding bodies and parts of motor vehicles.

23. (New) A remote laser welding method comprising the steps of generating a laser beam along an incoming vertical direction, orienting and focusing said laser beam in a spatial sector on a zone to be welded, and wherein said laser beam is deviated within an optical head from said incoming vertical direction to a horizontal direction and is consequently oriented around a first horizontal axis, which is orthogonal to said horizontal direction, as well as around a second horizontal axis, coinciding with said direction, the focusing step being performed within said optical head upstream of the orienting step and along said vertical direction so as to focus said laser beam on different distances inside said spatial sector.

24. (New) Method according to claim 23, wherein said horizontal direction is vertically moveable

25. (New) Method according to claim 23, wherein said horizontal direction is turnable around said vertical direction.

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26. (New) Method according to claim 24, wherein said horizontal direction is turnable around said vertical direction.

27. (New) Method according to claim 23, wherein said spatial sector is a spherical crown sector.

28. (New) Method according to claim 23 applied to the welding of bodies and parts of motor vehicles by means of a Cartesian robot which continuously tracks the focused spot during the welding phases, while the body or part being welded is kept stationary.